

Cotton Subsidies, the WTO, and the ‘Cotton Problem’

John Baffes

The World Bank
Development Economics
Development Prospects Group
&
Poverty Reduction and Economic Management Network
May 2011



Abstract

Following an 8-year long dispute over cotton subsidies, Brazil and the United States signed a *Memorandum of Understanding* on April 21, 2010, effectively paving the way for settling the dispute. This paper argues that cotton subsidies are just the tip of the iceberg while a number of other, perhaps more important, issues require attention and, indeed, political will. Chief among them is the persistent divergence between cotton prices and the prices of other agricultural commodities, which reflects, for the most part, the large supply response by China and India, a direct consequence of conversion to biotech cotton varieties in these (and other) countries. Such

response—which kept cotton prices low, compared with other commodities—imposes a competitive disadvantage to non-users of biotech cotton. The paper also highlights two additional constraints faced by the cotton producing countries of West and Central Africa, namely, the structural inefficiencies of their primary processing industries (also known as ginning) and the appreciation of the CFA franc against the US dollar. Without downplaying the importance of subsidy elimination, the paper concludes that these impediments should receive high priority in the policy agenda.

This paper is a product of the joint product of the Development Prospects Group, Development Economics and the Trade Department, Poverty Reduction and Economic Management Network. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at jbaffes@worldbank.org.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Cotton Subsidies, the WTO, and the ‘Cotton Problem’

John Baffes*

KEY WORDS: Cotton dispute, cotton subsidies, C-4, WTO

JEL: F13, F15, Q17, Q18

This was prepared under auspices of the UK-supported Global Trade and Financial Architecture project. The views expressed are personal and should not be attributed to the World Bank. I would like to thank Uri Dadush, Vera Eidelman, and Tassos Haniotis for comments and suggestions on earlier drafts.

* John Baffes is a senior economist with the World Bank’s Development Prospects Group.

Cotton Subsidies, the WTO, and the ‘Cotton Problem’

1. INTRODUCTION

For nearly a decade, Brazil and the United States have been embroiled in a dispute over cotton subsidies. On April 6, 2010, the US Trade Representative and the US Secretary of Agriculture announced that the countries agreed upon a path toward negotiated settlement (USTR 2010a). Two weeks later a *Memorandum of Understanding* was signed (USTR 2010b) while on June 17, 2010 the framework agreement was made public (USTR 2010c). The agreement highlights both strengths and limitations of the current dispute settlement system. On the one hand, a negotiated settlement was reached through WTO rules and a “trade war” was avoided. Moreover, the agreement shows that less powerful members of the global trading system (in this case, Brazil) can successfully argue their case in the WTO. But two key limitations were also exposed: Unless the “injured” party has enough trade leverage with the “guilty” party, authorization of countermeasures—the typical WTO stimulus to encourage compliance—is of limited use (and is costly to the imposing country and does not assist cotton producers, see Anderson 2002). Many countries may not be able to economically justify taking their case to the WTO, either because of weak capacity or because the relevant sector is too small to justify raising the issue.

In addition to modifying certain elements of the Export Credit Guarantee Program, the agreement proposed the establishment of a fund for technical assistance and capacity building of Brazil’s cotton sector. Some of the fund’s resources will be used for activities related to international assistance to the cotton sector in certain other countries. Although not explicitly stated, the use of resources for third countries was in response to another on-going cotton dispute that was brought to the WTO in 2003 by four African cotton producing countries over the same subsidies. Therefore, the framework agreement, in addition to addressing the US-Brazil cotton dispute deals (at least in principle) with a number of complex development issues.

While these are noteworthy achievements, this paper argues that the cotton dispute, despite consuming a lot of political capital, constitutes just the tip of the iceberg. There are a number of other issues at play that require attention by policy makers. Chief among them is the divergence between cotton prices and the prices of other agricultural commodities, which for the most part reflects the large supply response that took place in the cotton industry, as a consequence of the conversion to biotech varieties by China and India (which now account for 55 percent of global cotton supplies). The paper also highlights two key constraints

faced by the cotton producing countries of West and Central Africa (WCA), namely, the structural inefficiencies of the primary processing industry (also known as ginning), and the appreciation of the CFAf (the common currency of WCA countries) against the \$US. Without downplaying the importance of trade interventions, this paper concludes that addressing the technology, inefficiency, and macro impediments should receive high priority on the policy making agenda.

The rest of the paper proceeds as follows. The next section briefly examines the origins and the history of the cotton dispute. Section 3 discusses the broader implications of the agreement between Brazil and the United States. The penultimate section goes beyond trade and subsidies and argues that addressing the development aspects of the cotton dispute is complicated by a number of factors, the most important of which are the structural changes that have taken place in the global cotton market and the domestic inefficiencies faced by WCA cotton producers, including the countries that brought the cotton case to the WTO. The last section concludes.

2. THE COTTON DISPUTE

The origins of the cotton dispute go back to 2002 when Brazil and four African cotton producers (Benin, Burkina Faso, Chad, and Mali, the so-called C-4) argued that cotton subsidies caused world cotton prices to decline and reduced their export revenues.¹ At the time, the value of global cotton output averaged between \$25 and \$30 billion and the United States (which accounts for one-third of world cotton exports) supported its cotton industry to the tune of \$2 to \$4 billion annually (see figure 1). The EU provided considerable support to its cottons sector as well—around \$1 billion annually—though applied to much less cotton and hence much lower impact on world prices.²

¹ The issue of cotton subsidies received traction during a conference, co-sponsored by the International Cotton Advisory Committee and the World Bank during July 8-9, 2002, “Cotton and Global Trade Negotiations” in Washington, DC. The conference attracted a diverse group of participants including representatives from cotton producing countries (both government officials and private sector), civil society organizations, embassies, and international organizations. The ‘cotton problem’ received more publicity after Oxfam (2002) published the report “Cultivating Poverty” which highlighted both trade and development implications of cotton subsidies. A behind-the-scenes account of the cotton dispute can be found in a Harvard Business School case study (see Milligan, Goldberg, and Lawrence 2009).

² Numerous other countries subsidize their cotton sectors as well. However, they have received less attention either because their subsidies are small and indirect (e.g., India, Turkey, and some WCA countries) or because the accuracy of the statistics has been questioned (e.g., China). See ICAC (2010) for the latest update on cotton subsidies.

The cotton subsidies raised not only issues of trade fairness but also concerns regarding their negative impact on development. Although at a global level, cotton represents only 0.1 percent of world merchandise trade, in some developing countries it accounts for as much as one third of their export earnings (figure 2). Furthermore, while cotton is not important to the United States (it only contributes 0.4 percent to its merchandise exports), the United States is important to the cotton market since it accounts for one third of global exports. It is because of these imbalances that cotton subsidies received so much attention.

Even though the subsidies affect all non-subsidizing, cotton-producing countries, only Brazil and the C-4 chose to bring the case to the WTO and, despite the fact that both fought the same subsidies, they chose different paths. Brazil went the traditional dispute settlement route. On September 27, 2002 it requested consultations with the United States and soon the WTO's Dispute Settlement Body (DSB) established a panel to examine the issue (see WTO 2002). In its final ruling, issued on September 8, 2004, the WTO concluded that the United States had to remove the adverse effects of the subsidies or withdraw them. The United States appealed but the Appellate Body upheld the panel's original ruling. Subsequent compliance actions taken by the United States (including the removal of the step-2 payment, an export subsidy) did not satisfy Brazil and a compliance panel was established. WTO arbitrators issued awards totaling \$830 million (much lower than the \$3 billion requested by Brazil) and (effective April 7, 2010) allowed Brazil to impose countermeasures, including sectors outside merchandise trade such as intellectual property and services (see Schnepf 2010 for a timeline and analysis of the key events leading to the agreement).

The C-4 brought the case of cotton subsidies to the WTO as well but, instead of joining Brazil and proceeding within the usual WTO channels, entered uncharted territory by demanding financial compensation. On June 10, 2003, aided by the Geneva-based NGO IDEAS, the C-4 launched the "Sectoral Initiative in Favour of Cotton" (often referred to as the cotton initiative), demanding that countries discontinue cotton subsidies and directly compensate non-subsidizing countries.³ The rationale behind C-4's demand for financial compensation reflected (most likely) the fact that even a favorable WTO ruling allowing them to impose countermeasures would not have been of much help because of their limited trade with the United States and hence incapacity to pose a credible threat of retaliation. Moreover, because the C-4 (and numerous other developing countries) often impose high tariffs for tax revenue purposes, increasing them much

³ The initiative was presented at the Cancún Trade Ministerial Conference as the agenda item "Poverty Reduction: Sectoral Initiative in Favour of Cotton—Joint Proposal by Benin, Burkina Faso, Chad and Mali" (WTO 2003).

further could effectively eliminate imports.⁴

The cotton initiative marked the first time that the WTO had to deal with a financial compensation issue rather than the typical remedy of authorizing countermeasures.⁵ After the Cancún Ministerial in September 2003 it was decided that, because of numerous practical difficulties, the cotton initiative could be dealt within two tracks: development (compensation) and trade (subsidies). At the WTO-sponsored workshop in March of 2004, it was further decided that the International Financial Institutions and other international and bilateral organizations would help with the development component. The Doha Development Agenda (DDA) would address the trade component (see appendix A). Little progress has taken place on either front in the sense that financial compensation as envisaged by the cotton initiative has not taken place, while progress on DDA has been slow. In fact, it is believed that the inability to deal successfully with the cotton initiative may have been one of the main factors behind DDA's slow progress.

3. THE DEVELOPMENT IMPLICATIONS OF THE AGREEMENT

What triggered the agreement between Brazil and the United States? Most likely, the turning point was the authorization to impose cross-sectoral countermeasures outside of trade in goods, specifically intellectual property and services. From a strategic point of view, that was expected. As early as 2005, Zachary warned:

The Brazilians are eyeing things like computers, software, and heavy machinery. If and when those duties are imposed, it won't be just critics of govern-

⁴ The treatment of poor countries within the WTO has been discussed extensively. See Mattoo and Subramanian (2004) for a discussion regarding low income countries' limited ability to engage in reciprocity.

⁵ The issue of financial compensation as a WTO remedy is very complex both economically and legally. Furthermore, opinions on its effectiveness and likely impact on compliance differ. Davies (2006, p. 67), for example, argued that financial compensation "is likely to have a higher compliance inducement effect since the payment of a monetary amount to the claimant state is likely to be felt more keenly than trade compensation." But he also acknowledged that securing budgetary authorization for financial compensation may prove difficult for many countries. Yet, Mercurio (2009, p. 336) is critical of financial compensation: "... in fact, it could be argued that financial compensation could even result in decreasing Member's overall rate of compliance (given that all forms of compensation are essentially voluntary). In addition ... both trade and financial compensation raise a host of other unknowns and uncertainties which not only could potentially run counter to existing obligations or are contrary to deeply embedded principles of the WTO but also could possibly destabilize the entire dispute settlement system." In some respects, the cotton dispute highlights some of the difficulties pointed out by Mercurio (2009).

ment waste that will be alarmed over the cotton program. It'll be Caterpillar, Intel, Microsoft, and scores of other companies that, generally speaking, don't get a dime of direct subsidies and are far bigger players in the U.S. economy.

In other words, the United States came to this agreement in order to prevent domestic political collateral damage. Under the agreement—discussed in the next section—Brazil will not make use of the authorized countermeasures.

a. The framework agreement

The framework agreement consists of two key elements.

First, it would provide, as a basis for a discussion toward reaching a mutually agreed solution to the dispute, a limit on trade-distorting cotton subsidies. Second, the Framework would provide benchmarks for changes to certain elements of the current GSM-102 program. In the Framework, the United States and Brazil would agree to meet quarterly to discuss the successor legislation to the 2008 Farm Bill as it relates to trade-distorting cotton subsidies and the operation of GSM-102. The Framework would not serve as a permanent solution to the Cotton dispute. However, it would provide specific interim steps and a process for continued discussions on the programs at issue with a view to reaching a solution to the dispute.

In effect, the United States agreed to make some near term modifications to the operation of Export Credit Guarantee Program. Under the program, private US banks extend credit guarantees to approved foreign banks for purchase of US agricultural products. Technically speaking, this part of the agreement is the most relevant to the trade dispute. But, the concession is very small given that the most “damaging” components of the US cotton program take the form of marketing loans and countercyclical payments. These are expected to be addressed in the 2012 US Farm Bill.⁶

Two other elements of the agreement tell a more interesting story. ... the United States agreed to work with Brazil to establish a fund of approximately \$147.3 million per year on a pro rata basis to provide technical assistance and capacity building to the cotton sector in Brazil, and **for international cooperation related to the same sector in certain other countries** [emphasis added]. Under the Memorandum of Understanding that the United States and Brazil signed on April 20, 2010, the fund would continue until passage of the next Farm Bill or a mutually agreed solution to the Cotton dispute is reached, whichever is sooner. The fund is subject to transparency and auditing requirements.

Thus, the United States will compensate Brazil's cotton sector, until the subsidies are dealt with, which is what the C-4 had asked for and never received. More interestingly, the agreement mentions international cooperation related to the same sector in certain other countries, in effect recognizing that there are oth-

⁶ Or, as IDEAS (2010, p. 2) put it: “What Brazil obtains thanks to this framework deal is leverage on the Farm Bill, a means to influence the future US cotton support regime.”

er developing countries which have been “injured” by the subsidies but never brought their cases to the WTO (or, as with the C-4, they brought the case to the WTO but did not join Brazil).⁷

b. The broader implications of the agreement

From the perspective of the world trading system, the agreement is a step in the right direction. Apart from avoiding a “trade war”, the agreement makes progress towards addressing two key shortcomings of the current trading system: the inability of less powerful trading partners to bring their cases to the WTO and the need to broaden “sentencing” to include financial compensation when countermeasures are not applicable. Furthermore, the agreement rightly addresses some of the development issues that have been debated not only within the context of the cotton initiative but also within the DDA process. Nevertheless, implementation of the agreement is likely to encounter numerous difficulties.

Giving technical assistance to Brazil’s cotton producers implies a more efficient Brazilian cotton sector thus, more cotton being supplied in the world market and lower world cotton prices. Admittedly, the amount specified in the agreement is unlikely to have any significant impact on the global cotton market hence this point may be viewed as a theoretical concern.⁸ But it does highlight the fact that resolving the dispute through financial compensation may create collateral damage, unless such compensation takes place in a non-distortionary manner.

At a more pragmatic level, if addressing “*international cooperation related to the same sector in certain other countries*” means that part of the fund will be used for other countries, then there are several difficulties with delivery mechanisms and coordination arrangements. For example: Does Brazil need any more assistance than, say, Ethiopia or Malawi? Should cotton exporting countries other than the C-4 receive assistance, perhaps, Australia, India, Uzbekistan? Should countries that are cotton producers but not exporters receive assistance, since their producers received lower prices too? Who receives assistance: the country’s finance department through a budget support mechanism or should support go

⁷ The language used in the Memorandum was more specific in that it referred to the cotton sector explicitly and it mentioned countries and regions: “*the fund may also be used for activities related to international cooperation in the cotton sector in sub-Saharan Africa, in Mercosur member and associate members, in Haiti, or in any other developing country as the parties may agree upon ...*” See Baffes (2010a) for a summary discussion of the Memorandum of Understanding.

⁸ However, if compensation was based on Brazil’s request of \$US 3 billion, then the effect would be significant.

directly to the producers? If the latter, how is the assistance going to be distributed among several hundred thousand smallholders?

Interestingly, it was difficulties in answering these (and numerous other) questions that led to the separation of the cotton dispute into trade (subsidies) to be dealt within the DDA framework and development (compensation) to be dealt by existing aid delivery mechanisms from multilateral and bilateral development agencies. However, the development aspects of the cotton dispute not only are complex, but are much more important than subsidies, as the next section argues.

4. BEYOND SUBSIDIES AND TRADE

While the elimination of cotton subsidies is indeed important from trade fairness and development perspectives, this is just the tip of the iceberg as far as African cotton growers are concerned. There are broader and deeper issues in the global cotton market with much stronger impact on cotton prices and growers' incomes. In fact, there is a 'cotton problem' not just a 'cotton dispute' as figure 3 illustrates. This section places the issue of cotton subsidies into perspective by analyzing them side-by-side with other issues affecting the global cotton market, namely, biotech cotton varieties, structural inefficiencies of the WCA ginning industry, and the appreciation of the CFAf against the \$US.

a. The divergence between cotton and other agricultural prices

Cotton prices have been low during the past decade. Interestingly, such weakness took place against the backdrop of the broadest and largest commodity price boom during post-WWII (World Bank 2009). Between 2003 and 2008, nominal prices of energy and metals increased by 230 percent, those of food and precious metals doubled, and those of fertilizers increased fourfold. The boom reached its zenith in July 2008, when crude oil prices averaged \$US 133/barrel, up 94 percent from a year earlier. Rice prices doubled within just five months of 2008, from \$US 375/ton in January to \$757/ton in June. And, while most prices have weakened considerably since their 2008 peak, they are still twice as high compared to their early 2000s real levels.

Yet, cotton prices did not join the boom. Between 2000 and 2009 the World Bank index of nominal food prices doubled but cotton prices remained almost unchanged (see figure 4). Econometric evidence strongly confirms the divergence between cotton and other agricultural commodity prices. Consider the following ordinary least squares regression:

$$\log(P_t^C) = \mu + \beta_1 \log(P_t^{AG}) + \beta_2 \log(MUV_t) + \beta_3 t + \varepsilon_t. \quad [1]$$

P_t^C and P_t^{AG} denote the price of cotton and the agricultural commodity price index in year t (expressed in nominal dollar terms), MUV_t denotes the deflator, t is the time trend, and ε_t denotes the error term; μ , β_1 , β_2 , and β_3 are parameters to be estimated. The first two rows of table 2 report results for the 1960-2009 and 1960-10 periods, respectively (the exclusion/inclusion of 2010 was motivated by the desire to capture the effect of remarkable recovery in cotton prices that took place in 2010). The estimate of β_1 is 0.61 (without 2010) and 0.66 (with 2010) and highly significant in both cases with adjusted- R^2 s equal to 0.91 and ADF statistics of -6.03 and -6.21, implying a very strong co-movement between cotton prices and the agricultural commodity price index.

To examine the divergence between agriculture and cotton prices, [1] was reformulated by introducing two dummy variables, D_1 (equal to 1 during 1960-2001 and zero elsewhere) and D_2 , applied to both μ and β_1 . Hence, [1] becomes:

$$\log(P_t^C) = D_1 + D_2 + \beta_{11} D_1 \log(P_t^{AG}) + \beta_{12} D_2 \log(P_t^{AG}) + \beta_2 \log(MUV_t) + \beta_3 t + \varepsilon_t. \quad [2]$$

Results from [2] are reported in columns 3-6 of table 2. To examine the sensitivity of the model, columns 3 and 4 show results corresponding to D_1 taking the value of one during 1960-2001. In view of the large cotton price increase in 2010, the model was run with and without the last observation, 2010. Columns 5 and 6 correspond to D_1 taking the value of one during 1960-2002, again with and without 2010. The choice of 2001 or 2002 as the break year is expected to capture the introduction of biotech cotton in China and India.

Regardless of the specification considered, the econometric evidence overwhelmingly shows that while there was a strong relationship between the price of cotton and the other agricultural commodity prices up to 2002 that relationship weakened considerably during 2003-10. While it is unclear whether the gap will persist much longer, the fact that it has persisted for almost a decade implies considerable welfare losses for non-users of biotech cotton varieties. The next section discusses the reasons behind the divergence.

b. Causes of the divergence

There are three reasons why cotton prices did not join the commodity price boom (they are discussed in order of importance.) The first, and perhaps most important, reason is the rapid and massive expansion of cotton production that took place in China and India, as a direct consequence of these countries' adoption of biotech cotton. During the five-year period 2002-07, China increased its cotton output by 55 percent (from 5.2 to 8.1 million tons) while India increased its out-

put by 125 percent (from 2.3 to 5.2 million tons).⁹ Today, these two countries dominate the global cotton industry, accounting for more than half of global cotton production, mostly from biotech varieties. During 2009/10, biotech cotton varieties as a share of cotton area accounted for 68 percent in China and 79 percent in India (see figure 5).¹⁰

Notice that the pros and cons of adopting biotech cotton varieties have been extensively discussed (see Tripp 2009 for a comprehensive review of the literature). For example, FAO's (2004) review showed that on balance, biotech cotton growers are better off than growers of conventional varieties. Baffes (2005) argued that in addition to subsidy elimination and domestic reforms, adoption of biotech varieties should have been a priority among policymakers in low-income cotton producing countries. Similarly, Falck-Zepeda, Horna and Smale (2007) and Anderson and Valenzuela (2008) conclude that the downward pressure on world cotton prices caused by the large-scale adoption of biotech cotton is likely to force other countries to adopt the technology in order to compete in the global market. Anderson and Valenzuela (2007) found that the benefits from full adoption of biotech cotton varieties by African cotton-producing countries could be even greater than the benefits of the removal of all cotton subsidies by the United States and the European Union. Subramanian and Qaim (2010) found that the expansion of biotech cotton in India contributed to poverty reduction and rural development.¹¹ Yet, with the single exception of Burkina Faso which engaged in biotech trials earlier in the decade and is well into fully converting to biotech varieties, no other SSA country has taken concrete steps in addressing this issue (see figure 6).

Second, as discussed earlier, cotton subsidies encourage more production than would have taken place without the support. They therefore depress world

⁹ The rapid expansion of biotech cotton has been facilitated by the absence of negative consumer reaction because cotton is not viewed as a food crop—though cotton oil, a key by-product of seed cotton, is a food item; it represents about 10 percent of the value of cotton (although only 3 percent of global production of the 17 most important fats and oils).

¹⁰ Most of increase in cotton production in China and India came from yield increases. The reason biotech cotton induces large yield increases in developing countries reflects the fact that in these countries, growers spray much less compared to developed countries. Because biotech technology requires less numbers of sprayings, its adoption implies an outward shift of the production possibilities frontier (when applied in developing countries) rather than a move along the production possibility frontier (when applied in developed countries).

¹¹ For a discussion of the political economy of agricultural biotech policies in developing countries see Paarlberg (2008), Graff, Hochman, and Zilberman (2009), and Herring (2009).

prices.¹² The effect of subsidies on the world price of cotton has been hotly debated and the estimates vary widely. After reviewing the literature, Baffes (2005, p. 122) concluded that “... *setting all differences aside, however, and taking a simple average over all models shows that world cotton prices would have been 10 percent higher without support.*” Sumner (2006, p. 19) reached a remarkably similar conclusion: “*Weighing all the evidence from a variety of sources, a 10 percent increase in the world price of cotton is a reasonable estimate if the cotton subsidy programs were removed under the cotton initiative while other farm production subsidies were also reduced substantially.*” Jales (2010) found that reforms consistent with the December 2008 DDA draft modalities would imply world cotton prices 6 percent higher over 1998-2007 (ranging between a high of 10 percent in 2001 and a low of 2 percent in 2007). Reforms by the United States consistent with full implementation of DSB’s recommendations would have increased cotton prices by 3.5 percent (ranging between a high of 6.5 percent 2001 and a low of 1 percent in 2007).

Third, the 2006-08 boom in food prices was partly aided by growth in demand for biofuel production (albeit, much less than originally thought). Although the direct impact of biofuel demand is felt only by maize, sugarcane, and some edible oils, the indirect impact is felt by most agricultural crops, because of the strong substitutability both on the input side (i.e., by shifting land and other inputs from one crop to another) and on the output side (especially in animal feed and vegetable oils which are highly substitutable commodities). Because cotton is not a close substitute to any other commodity, there no substitutability on the output side. There is substitutability only on the input side as land can be used for other crops. But even there, substitutability is quite limited, at least in the short term, because other inputs, primary processing facilities, picking machinery, and other equipment are cotton-specific. Thus, converting cotton land to other crops and *vice-versa* takes more time compared to converting land from, say, wheat to maize. Indeed, between 2000-04 and 2005-09 (two periods that can be viewed as without and with biofuel as well), global area allocated to cotton declined by less than one percent.¹³

To summarize, subsidies and biofuel expansion have played relatively modest roles in widening the gap between cotton and agricultural prices. The chief reason behind the weakness in cotton prices has been the massive supply

¹² Distortions due to subsidies are not specific to cotton. Most commodity sectors are affected by import tariffs and many also by domestic supports, export subsidies or export taxes (see Aksoy and Beghin 2005, Anderson 2009).

¹³ Although cotton area in the United States declined by almost 20 percent during these two periods, global cotton area (excluding the United States) increased by 3 percent. Global maize area increased more than 10 percent during this period. The same change applied to the United States.

response by China and India. And, the key driver behind such supply response has been the adoption of biotechnology by those two countries, which contributed to both area expansion and yield increases (detailed biotech cotton adoption by country and year is reported in table B1 of Appendix B). Yet, as mentioned earlier (and elaborated in greater detail below), the cotton sectors of the C-4 face two additional impediments, namely the inefficiencies of their cotton industries and the region's exchange rate regime.

c. Further impediments faced by the C-4

The cotton industries of all WCA countries were pioneered by a French state-owned company in conjunction with national state-owned cotton companies.¹⁴ These companies had a legal monopsony in cotton buying, and most had a monopoly on primary processing, marketing, and supplying inputs. Typically, they would announce a base buying price before planting, sometimes supplementing that price with a second payment (payable in the following season) based on the company's financial health. Several policy reform attempts were made during the 1980s and 1990s, but the basic structure of the industries remained virtually unchanged (Baffes 2009).

Policy reforms were undertaken during the past few years (Tschirley, Poulton, and Labaste 2009). Burkina Faso led the effort by allowing competition, when two private companies entered the market in specific zones which produce about 15 percent of the country's cotton output. After several postponements, the cotton company of Benin was split into three private companies in 2008. Mali's cotton company, which has been operating in the traditional manner until 2010, is undertaking reforms with the ultimate objective to transition into a regional monopoly structure with four private companies. Finally, Chad's cotton sector has been virtually unreformed. Yet, despite the reforms in most WCA countries, the sectors have retained a number of their former characteristics: the ginning companies have high costs, panterritorial and panseasonal pricing schemes prevail, and (on some occasions) political interference in the sector continues due to its importance in the economies of these countries. As a result, operating costs for the ginning companies remain excessively high by international standards while the process of world prices signal transmission to domestic markets is very

¹⁴ The company was CFDT (*Compagnie Française de Développement des Fibres Textiles*). It was renamed to DAGRIS (*Développement des Agro-Industries du Sud*) in 2001. In January 2008 DAGRIS was renamed to *Geocoton* after it was purchased by the *Advens Group* (51 percent) and *CMA-CGM* (49 percent).

slow.¹⁵

A second impediment has been the CFAf's appreciation against the \$US. The CFAf was pegged to the French franc (FF) until 1999 and to the euro since then (1 € = 656 CFAf). Since its creation in 1945 it has been adjusted only twice: in October 1948 (from 1 FF = 1.70 CFAf to 2.00 CFAf) and in January 1994 (from 1 FF = 100 CFAf to 200 CFAf). The CFAf has been praised for offering macroeconomic stability to its members. However, because it is pegged to a currency of economies with structures and growth patterns not necessarily similar to those in WCA, the CFAf has been subjected to prolonged periods of large appreciation, thus placing the export sectors of these countries at a competitive disadvantage.¹⁶

Between 2000 and 2007, nominal world cotton prices increased 7 percent, from \$US 1.30/kg to 1.40/kg. The CFAf, however, appreciated against the \$US from CFAf 712 to CFAf 479 during this period.¹⁷ Hence, in domestic currency terms, the C-4 cotton producers experienced a 28 percent decline in the nominal price of cotton. In fact, the CFAf has experienced the highest appreciation against the \$US compared to the currencies of the world's largest cotton suppliers some of which depreciated quite a lot during this period (see figure 7). Five of the eight countries depicted in figure 7 are the world's top cotton exporters: United States (not included in the figure), India, Uzbekistan, WCA, Brazil, and Australia.

5. CONCLUSION

This paper examined the implications of the *Memorandum of Understanding* between Brazil and the United States over their long-running cotton dispute. It concludes that in addition to ending the dispute, and thus avoiding a trade war,

¹⁵ Although the cotton sectors of WCA countries have been taxed, this is not specific to either cotton or the countries in question. SSA is the only region in the world that still taxes agriculture. Anderson and Masters (2009) estimate that the Nominal Rate of Assistance (taxation when negative) to export commodities in Africa averaged close to 20 percent during the early 2000s. In a study that compared the cotton by-products industries of various countries, Baffes (2010b) notes that while in the US the value of by-products roughly covers the costs of ginning, in Benin and Burkina Faso it covers only one quarter, further evidence of the inefficiencies of and relatively low prices in the WCA cotton sectors.

¹⁶ In many respects, this is similar to the problems surfaced in the periphery of the euro zone during 2010. The macroeconomic stability (including low inflation and low interest rates) enjoyed by all euro members came at the expense of competitiveness of some members.

¹⁷ The CFA's overvaluation of the early 1990s led to the 1994 devaluation. Numerous authors had measured the degree of CFAf's overvaluation. For example, Devarajan (1999), using a simple CGE model, estimated that during 1993, the CFAf overvaluation ranged from a low 3 percent (Benin) to a high of 78 percent (Cameroon). Baffes et al (1999) used a reduced form econometric model and estimated that Côte d'Ivoire's overvaluation exceeded 40 percent in 1993.

the *Memorandum* touches upon two key constraints of the current WTO conflict resolution process, namely, the inability of less powerful trading partners to bring their cases to the WTO and the need to broaden the “sentencing” pending the bringing of inconsistent policies into conformity with WTO law.¹⁸

What would have been a more appropriate course of action? For the United States (and other cotton-subsidizing countries), not having subsidies at all or, a second best, phasing them out as the US General Accountability Office (1995) recommended 15 years ago.¹⁹ For the C-4 (and, perhaps, other cotton producing developing countries) joining forces with Brazil in its dispute settlement case may have been most beneficial. Going forward, until WTO rules are reconfigured to address the dispute settlement system’s shortcomings, the smallest and poorest developing countries should align their interest and form coalitions with more powerful developing nations. Of course, such opportunities may not be available, underscoring the need to reconsider the dispute settlement system.

While stressing the importance of subsidy elimination, this paper argues that the solution to the ‘cotton problem’ would require actions on other fronts as well. First, the WCA (and other developing) countries should embrace new technologies to increase their competitiveness. The most promising avenue to pursue at the moment is adoption of biotech cotton varieties, following China’s and India’s lead (and, more recently Burkina Faso’s). Second, cotton producing countries should deepen and broaden their domestic reform efforts in order to reduce costs of production, especially at the primary processing level via increased competition in ginning. On the other hand, it should be recognized that the WCA countries lost competitiveness during the early and mid-2000s because of the CFAf’s appreciation against the \$US. Because it is beyond the control of an individual WCA country to choose the exchange rate regime that is consistent with the structure of its economy, the case for deepening the on-going policy reforms and accelerating the adoption of new technologies is even more compelling.

But, at the outset, it all comes down to three basic principles: (i) do not distort global markets to ensure a level playing field, (ii) undertake all necessary

¹⁸ It should be recognized, however, that this issue is quite complex economically and legally (see Bagwell, Mavroidis, and Staiger 2007).

¹⁹ GAO (p.3) concluded as follows: “The cotton program has evolved over the past 60 years into a costly, complex maze of domestic and international price supports that benefit producers at great cost to the government and society. From 1986 through 1993, the cotton program’s costs totaled \$12 billion, an average of \$1.5 billion a year. Moreover, the program is very complex, with dozens of key factors that interact and counteract to determine price, acreage, and payments and to restrict imports. The severe economic conditions and many of the motivations that led to the cotton program in the 1930s no longer exist ... The Congress could, for example, reduce or phase out payments over a number of years, perhaps over the life of the next [1996] farm bill.”

domestic policy reforms to reduce costs, and (iii) adopt new technologies to maintain competitiveness.

Table 1: Cotton Exports

	<i>1990-94</i>	<i>1995-99</i>	<i>2000-04</i>	<i>2005-09</i>	<i>1990-94</i>	<i>1995-99</i>	<i>2000-04</i>	<i>2005-09</i>
	<i>----- Thousand tons -----</i>				<i>----- Share (%) -----</i>			
United States	1,539	1,418	2,479	2,978	26.0	25.1	37.6	37.5
European Union	233	329	345	312	3.9	5.8	5.2	3.9
Brazil	48	6	171	435	0.8	0.1	2.6	5.5
C-4	289	485	558	490	4.9	8.6	8.5	6.2
<i>enin</i>	76	136	141	98	1.3	2.4	2.1	1.2
<i>urkina Faso</i>	60	95	164	219	1.0	1.7	2.5	2.8
<i>had</i>	50	73	61	40	0.8	1.3	0.9	0.5
<i>1ali</i>	104	180	192	134	1.8	3.2	2.9	1.7
Others	3,811	3,403	3,048	3,719	64.4	60.3	46.2	46.9
WORLD	5,919	5,641	6,601	7,934	100	100	100	100

Source: United States *Department of Agriculture*

Note: Cotton used to be a key contributor to Chad's export revenues. Today, Chad's key merchandise export is crude oil.

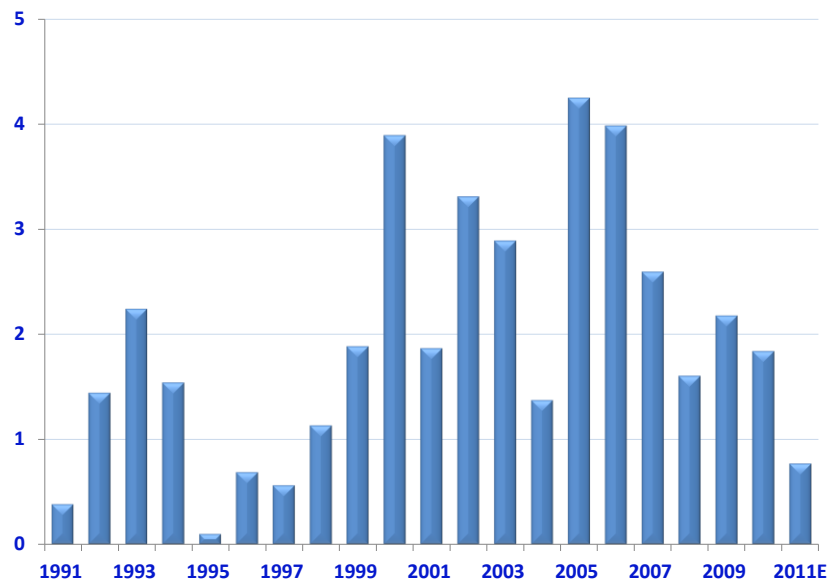
Table 2: Co-movement between Cotton and Agricultural Commodity Prices

	----- Eq. (1) -----		— Eq. 2 (D1=1, 1960-2001) —		— Eq. 2 (D1=1, 1960-2002) —	
	1960-2009	1960-2010	1960-2009	1960-2010	1960-2009	1960-2010
μ	-0.23 (1.14)	-0.23 (1.14)				
$D1$			-0.15 (0.57)	0.02 (0.05)	-0.02 (0.07)	-0.12 (0.43)
$D2$			2.80*** (2.73)	1.49 (1.63)	2.30** (2.53)	1.69* (1.64)
β_1	0.61*** (5.97)	0.66*** (6.34)				
$\beta_{11}D1$			0.85*** (7.53)	0.89*** (7.34)	0.87*** (7.62)	0.87*** (7.13)
$\beta_{12}D2$			0.23 (1.29)	0.55*** (3.88)	0.36** (2.37)	0.48*** (2.85)
β_2	0.67*** (5.16)	0.60*** (4.49)	0.33** (2.16)	0.22 (1.31)	0.26 (1.63)	0.30* (1.81)
$100*\beta_3$	-2.29*** (7.31)	-2.11*** (6.29)	-1.30*** (2.69)	-0.86 (1.52)	-0.98* (1.85)	-1.19* (2.30)
$Adj-R^2$	0.91	0.91	0.93	0.92	0.93	0.92
ADF	-6.03***	-6.21***	-7.17***	-7.00***	-7.34***	-6.86***

Source: Author's estimates based on World Bank price data.

Notes: The dependent variable is the logarithm of cotton price. The numbers in parentheses denote absolute *t-values* while asterisks denote parameter estimates significant at 10 percent (*), 5 percent (**) and 1 percent (***) levels, respectively. ADF is the Augmented Dickey-Fuller (Dickey and Fuller 1979) statistic for unit root and corresponds to the MacKinnon one-sided *p-value*. The lag length of the corresponding ADF equations was determined by minimizing the Schwarz-loss function. The standard errors and covariance matrix have been estimated in a heteroskedasticity-consistent manner using White's method.

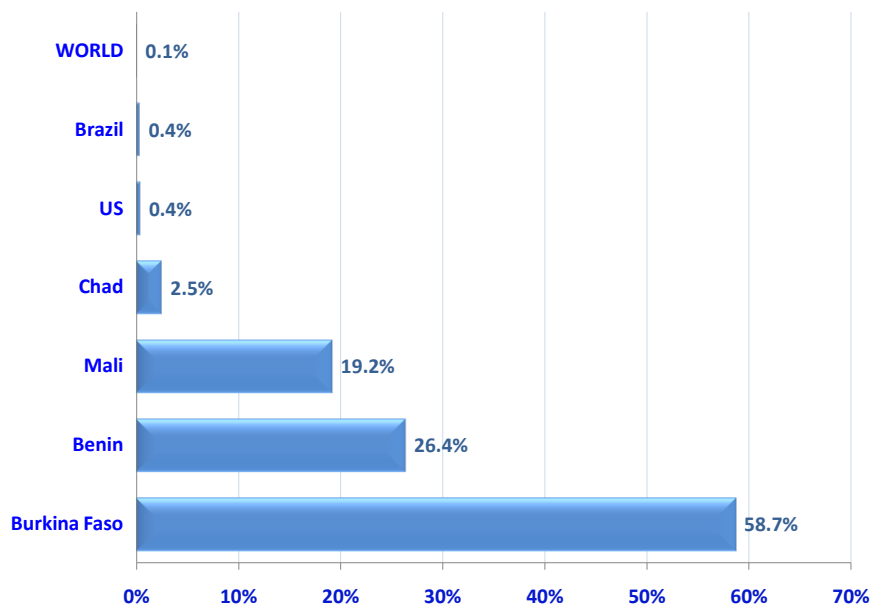
Figure 1
Budgetary Outlays to the US Cotton Sector (Billion of Nominal \$US)



Notes: The figures refer to fiscal year (Oct-Sep). Years 2010 and 2011 are estimates as of November 2010.
Source: US Department of Agriculture (CCC Net Outlays by Commodity and Function, Table 35).

1

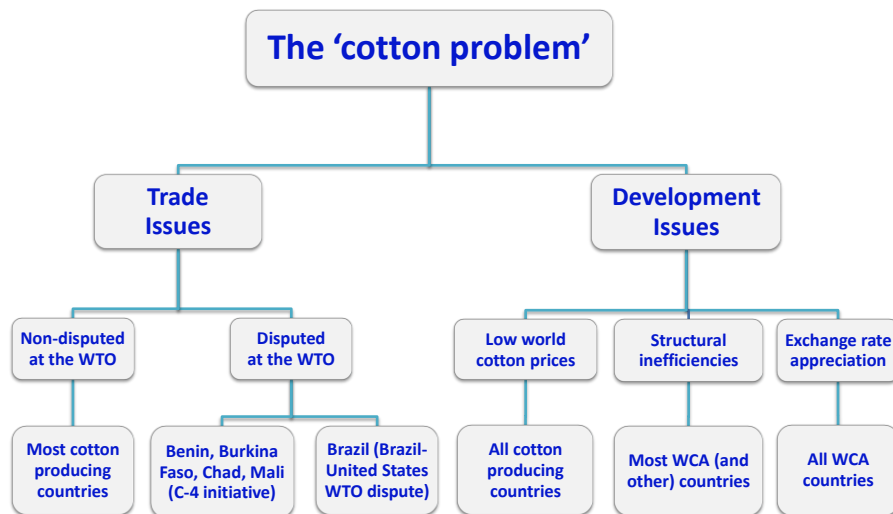
Figure 2
Cotton Exports as Share of Total Merchandize Exports (2004-07 Average)



Source: Author's calculations based on IMF (IFS statistics) and Word Bank data

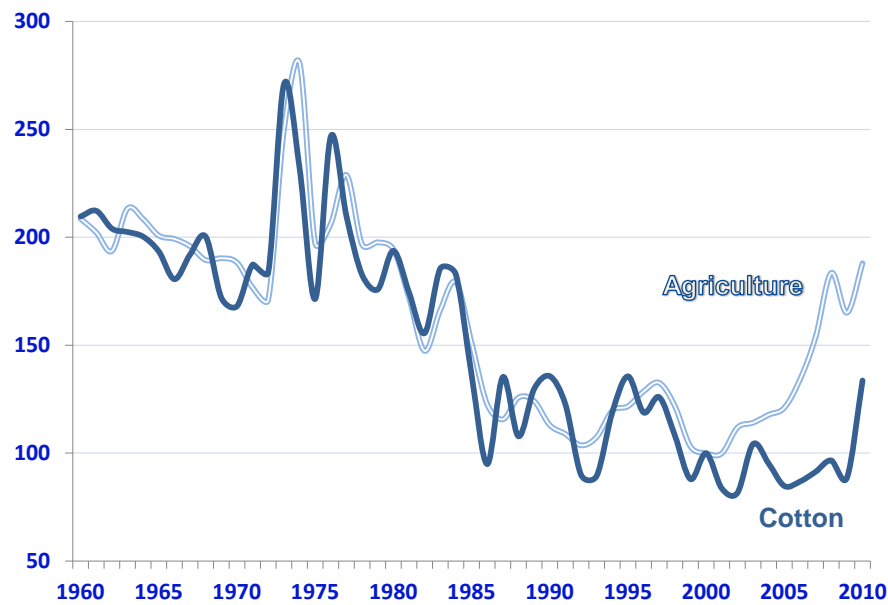
2

Figure 3
The 'Cotton Problem' is more than Trade and Subsidies



3

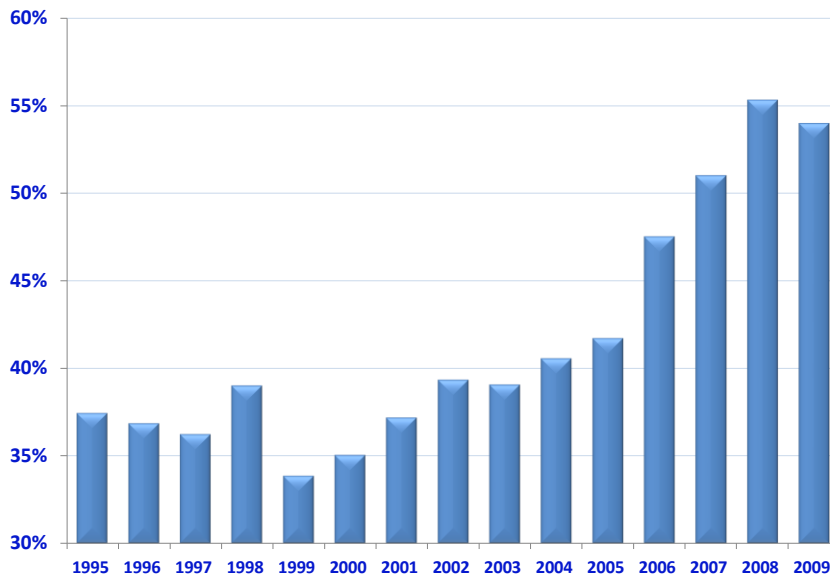
Figure 4
Agriculture and Cotton Price Indices (Real, MUV-deflated, 2000=100)



Source: World Bank

4

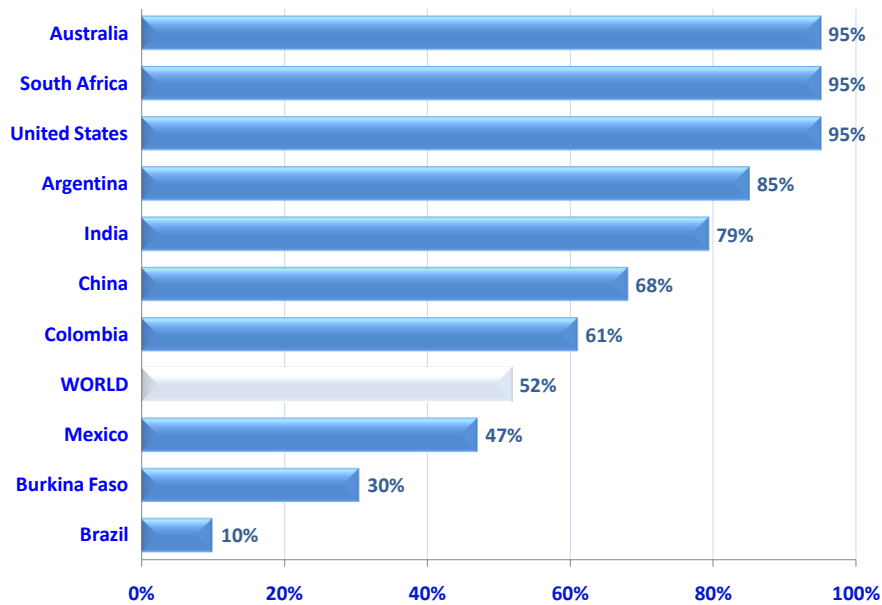
Figure 5
China's and India's Share of Global Cotton Production



Source: International Cotton Advisory Committee

5

Figure 6
Area under Biotech Cotton as a Share of Total Cotton Area, 2009/10

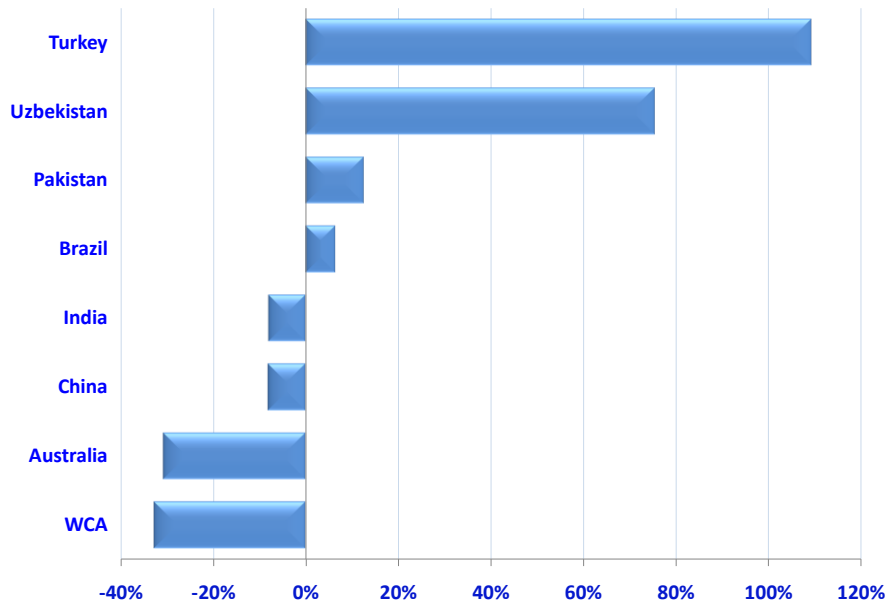


Source: International Cotton Advisory Committee

6

Figure 7

**Appreciation (-)/Depreciation (+) of Local Currencies against the \$US
(% change from 2000 to 2007)**



Source: Author's calculations based on IMF (IFS statistics)

7

References

- Aksoy, Ataman and John Beghin (2005). *Global Agricultural Trade and Developing Countries*. Washington, DC: The World Bank.
- Anderson, Kym (ed.) (2009). *Distortions to Agricultural Incentives: A Global Perspective, 1955-2007*. London: Palgrave Macmillan and Washington, DC: The World Bank.
- _____ (2002). "Peculiarities of Retaliation in WTO Dispute Settlement", *World Trade Review* 1(2): 123-34, July.
- _____ and Ernesto Valenzuela (2007). "The World Trade Organization's Doha Cotton Initiative: A Tale of Two Issues," *The World Economy* 30: 1281-1304.
- _____ and Ernesto Valenzuela (2008). "Recent and Prospective Adoption of Genetically Modified Cotton: A Global CGE Analysis of Economic Impacts" (with E. Valenzuela and L.A. Jackson), *Economic Development and Cultural Change* 56(2): 265-96, January.
- _____ and William Masters (2009). *Distortions to Agricultural Incentives in Africa*. Washington, DC: The World Bank.
- Baffes, John (2010a). "Learning from the 'Cotton Problem': Settling Trade Disputes." *International Economic Bulletin*, June. <http://www.carnegieendowment.org/publications/index.cfm?fa=view&id=41003>
- _____ (2010b). "Markets for Cotton By-Products: Global Trends and Implications for African Cotton Producers." *Policy Research Working Paper* 5355, June. Washington, DC: The World Bank.
- _____ (2009). "Benin, Burkina Faso, Chad, Mali, and Togo." In Kym Anderson and William A. Masters, eds., *Distortions to Agricultural Incentives in Africa*. Washington, DC: The World Bank.
- _____ (2007). "Cotton Developments in West Africa: Domestic and Trade Policy Issues and the WTO." In Jamie Morrison and Alexander Sarris, eds., *WTO Rules for Agriculture Compatible with Development*. Rome: Food and Agriculture Organization of the United Nations.
- _____ (2005). "The Cotton 'Problem'," *World Bank Research Observer* 20: 109-144.
- _____, Ibrahim A. Elbadawi, and Stephen A. O'Connell (1999). "Single-Equation Estimation of the Equilibrium Real Exchange Rate." In Larry E. Hinkle and Peter J. Montiel, eds., *Exchange Rate Misalignment: Concepts and Measurements for Developing Countries*. New York: Oxford University Press.
- Bagwell, Kyle, Petros C. Mavroidis and Robert W. Staiger (2007), "Auctioning Countermeasures in the WTO", *Journal of International Economics* 73: 309-332.

- Davies, Arwel (2006). "Reviewing Dispute Settlement at the World Trade Organization: A Time to Reconsider the Role/s of Compensation?" *World Trade Review* 5: 31–67.
- Devarajan, Shantayanan (1999). "Estimates of Real Exchange Rate Misalignment with A simple General Equilibrium Model." In Larry E. Hinkle and Peter J. Montiel, eds., *Exchange Rate Misalignment: Concepts and Measurements for Developing Countries*. New York: Oxford University Press.
- Dickey, David and Wayne A. Fuller (1979). "Distribution of the Estimators for Time Series Regressions with Unit Roots," *Journal of the American Statistical Association* 74: 427–431.
- Falck-Zepeda, Jose, Daniela Horna, and Melinda Smale (2007). "The Economic Impact and the Distribution of Benefits and Risks from the Adoption of Insect Resistant (*Bt*) Cotton in West Africa." *Discussion Paper No. 718*. Washington, DC: International Food Policy Research Institute.
- Food and Agriculture Organization (FAO) (2004). *The State of Food and Agriculture—Agricultural Biotechnology: Meeting the Needs of the Poor?* Rome: Food and Agriculture Organization of the United Nations.
- Graff, Gregory D., Gal Hochman, and David Zilberman (2009). "The Political Economy of Agricultural Biotechnology Policies." *AgBioForum* 12: 34–46.
- Herring, Ronald J. (2008). "Opposition to Transgenic Technologies: Ideology, Interests, and Collective Action Frames." *Nature Reviews Genetics* 9: 458–463.
- IDEAS (2010). "Cotton Update: Brazil and the US Play extra Time." *Newsletter no 86*. July, 2. Geneva.
- International Cotton Advisory Committee (ICAC) (2010). "Government Support to the Cotton Industry." Washington, DC: International Cotton Advisory Committee.
- Jales, Mário (2010). "How would a WTO Agreement on Cotton Affect Importing and Exporting Countries?" ICTSD Programme on Agricultural Trade and Sustainable Development, Issue Paper No. 26. Geneva, Switzerland: International Centre for Trade and Sustainable Development.
- Mattoo, Aaditya and Arvind Subramanian (2004). "The WTO and the Poorest Countries: the Stark Reality." *World Trade Review* 3: 385–407.
- Mercurio, Bryan (2009). "Why Compensation Cannot Replace Trade Retaliation in the WTO Dispute Settlement Understanding." *World Trade Review* 8: 315–338.
- Milligan, Katherine, Ray Goldberg, and Robert Lawrence (2009). "Brazil's WTO Cotton Case: Negotiation through Litigation." In *Case Studies in Trade Negotiations*, vol. 2. Institute for International Economics.

- Oxfam (2002). "Cultivating Poverty: The Impact of Cotton Subsidies on Africa." Briefing Paper, no. 30. Oxfam International.
- Paarlberg, Robert (2008). *Starved for Science: How Africa Biotechnology Is Being Kept out of Africa*. US: Harvard University Press.
- Schnepf, Randy (2010). "Brazil's WTO Case against the U.S. Cotton Program", Congressional Research Service. Report RL32571, Washington DC, April 6.
- Subramanian, Arjunan and Matin Qaim (2010). "The Impact of *Bt* Cotton on Poor Households in Rural India," *Journal of Development Studies* 46: 295-311.
- Sumner, Daniel A. (2006). "Reducing Cotton Subsidies: The DDA Cotton Initiative." In Kym Anderson and Will Martin, eds., *Agricultural Trade Reform and the Doha Development Agenda*. Washington, DC: World Bank.
- Tschirley, David, Colin Poulton, and Patrick Labaste (2009). *Organization and Performance of Cotton Sectors in Africa: Learning from Reform Experience*. Washington, DC: World Bank.
- Tripp, Robert (2009). *Biotechnology and Agricultural Development: Transgenic Cotton, Rural Institutions and Resource-Poor Farmers*. New York: Routledge, Taylor and Francis Group.
- United States General Accounting Office (GAO) (1995). "Cotton Program: Costly and Complex Government Program Needs to Be Reassessed." RCED-95-107, June 20. Report to the Honorable Richard K. Armey, United States House of Representatives. Washington, DC.
- United States Trade Representative (USTR) (2010a). "U.S., Brazil Agree Upon Path toward Negotiated Solution of Cotton Dispute: Would Avoid Imposition of Countermeasures against U.S. Exports, U.S. Intellectual Property Rights" April 6. Washington, DC: Office of the United States Trade Representative.
- _____ (2010b). "U.S., Brazil Agree on Memorandum of Understanding as Part of Path Forward toward Resolution of Cotton Dispute: Countermeasures to be Deferred for an Additional Sixty Days" April 21. Washington, DC: Office of the United States Trade Representative.
- _____ (2010c). "U.S., Brazil Agree on Framework Regarding WTO Cotton Dispute" June 17. Washington, DC: Office of the United States Trade Representative.
- World Bank (2009). *Global Economic Prospects: Commodities at the Crossroads*. Washington, DC: World Bank.
- World Trade Organization (WTO) (2005). "Doha Work Programme: Ministerial Declaration." WT/MIN(05)/DEC. Honk Kong: World Trade Organization, December 18, 2005. www.wto.org/english/thewto_e/minist_e/min05_e/fin

[nal text e.htm](#)

_____ (2004). "WTO African Regional Workshop on Cotton: Summary Remarks." Cotonou, Republic of Benin, March 23-24.

_____ (2003). "Poverty Reduction: Sectoral Initiative in Favour of Cotton—Joint Proposal by Benin, Burkina Faso, Chad and Mali." WT/MIN(03)/W/2. Cancún, Mexico: World Trade Organization Ministerial Session, September 10-14. <http://docsonline.wto.org/DDFDocuments/t/WT/Min03/W2.doc>

_____ (2002). "United States—Subsidies on Upland Cotton: Request for Consultations by Brazil." WT/DS267/1. Geneva: World Trade Organization, October 3. [http:// docsonline.wto.org/imrd/gen_searchResult.asp?RN=0&searchtype=browse&q1=%28%40 meta%5FSymbol+WT%FCDS267%FC1%29&language=1](http://docsonline.wto.org/imrd/gen_searchResult.asp?RN=0&searchtype=browse&q1=%28%40meta%5FSymbol+WT%FCDS267%FC1%29&language=1)

Zachary, Paschal G. (2005). "100 percent Rotten." *Business 2.0*. December, 148-154.

APPENDIX A

The Key Milestones of the Cotton Dispute: The Cotonou Workshop and the Honk Kong Ministerial

The development component of the cotton initiative was addressed at a WTO-sponsored workshop (Cotonou, Benin, March 23-24, 2004.) The delivery mechanisms and coordination arrangements were outlined as follows (WTO 2004, paragraph 13):

On delivery mechanisms: *"The preference was widely held for the use of existing mechanisms in the delivery of financial and technical assistance. This position was itself based on the consistently held position by many developing countries for enhanced coordination within the development community in the delivery of financial and technical assistance, and the avoidance of the confusing proliferation of overlapping mechanisms. There was reluctance for the creation of new international bureaucracies and a preference for the more effective use of existing institutions. Bilateral donors and multilateral institutions considered that synergies should be built, with enhanced coordination, around the Poverty Reduction Strategy Papers (PRSPs) or national development plans, and the African Development Bank's Country Strategy Papers (CSPs), which are derived from priorities reflected in the PRSPs. Bilateral donors and multilateral institutions were in support of the accelerated use of the Integrated Framework for Trade-Related Technical Assistance for LDCs (IF), and the Joint Integrated Technical Assistance Programme for African Countries (JITAP). On such a fast-track basis, eligible countries would have the IF (for LDCs) and the JITAP (for African countries) used as the mechanisms for mainstreaming cotton-specific financial and technical assistance into the development vehicles of their PRSPs or national development plans and Country Strategy Papers and for delivering such assistance."*

On coordination arrangements: *"The specific issue of enhanced and focused coordination between bilateral donors and multilateral institutions was carefully considered, keeping in view the urgent necessity to retain the momentum and follow-up on the identified areas of financial and technical assistance after the Workshop. It was felt that coordination would need to take account of 4 crucial factors: knowledge of the region; poverty reduction targets, jurisdictional competence of the subject matter; and, bilateral donor partner support. As a result, there was broad support that the immediate follow-up process of coordination and implementation after the Workshop would be actively led by the World Bank, the African Development Bank, the ICAC, the FAO, bilateral donors including the United States and the European Commission, and one representative of the African cotton producing countries."*

The trade component of the cotton initiative was addressed at the WTO's 6th Ministerial (Honk Kong, December 13-18, 2005; see WTO 2005, paragraph 11):

*“We recall the mandate given by the Members in the Decision adopted by the General Council on 1 August 2004 to address cotton ambitiously, expeditiously and specifically, within the agriculture negotiations in relation to all trade-distorting policies affecting the sector in all three pillars of market access, domestic support and export competition, as specified in the Doha text and the July 2004 Framework text. We note the work already undertaken in the Sub-Committee on Cotton and the proposals made with regard to this matter. Without prejudice to Members’ current WTO rights and obligations, including those flowing from actions taken by the Dispute Settlement Body, we reaffirm our commitment to ensure having an explicit decision on cotton within the agriculture negotiations and through the Sub-Committee on Cotton ambitiously, expeditiously and specifically as follows: First all forms of **export subsidies** for cotton will be eliminated by developed countries in 2006. Second, on **market access**, developed countries will give duty and quota free access for cotton exports from least-developed countries (LDCs) from the commencement of the implementation period. Third, it is recognized that the objective is that, as an outcome for the negotiations, **trade distorting domestic subsidies** for cotton production should be reduced more ambitiously than under whatever general formula is agreed and that it should be implemented over a shorter period of time than generally applicable. We will commit ourselves to give priority in the negotiations to reach such an outcome.”*

APPENDIX B

Table B1: Area under biotech cotton varieties (percent of area allocated to cotton)

	US	Australia	Mexico	China	S. Africa	Argentina	India	Colombia	Brazil	B. Faso	WORLD
1996/07	12.7	7.7	0.8	—	—	—	—	—	—	—	2.0
1997/08	25.5	14.0	7.8	0.7	—	—	—	—	—	—	4.4
1998/09	45.0	15.4	14.3	2.4	12.0	0.8	—	—	—	—	6.6
1999/00	58.7	22.7	12.5	14.2	28.0	3.9	—	—	—	—	12.1
2000/01	71.1	30.0	33.4	25.0	24.0	6.1	—	—	—	—	15.7
2001/02	76.7	30.0	27.4	32.0	74.0	4.6	—	—	—	—	18.1
2002/03	75.4	30.0	37.6	48.7	84.0	8.0	0.5	—	—	—	20.2
2003/04	75.1	60.0	41.4	51.6	86.0	10.0	1.1	0.5	—	—	20.8
2004/05	78.0	60.0	60.6	59.1	75.0	10.0	6.1	23.0	—	—	24.3
2005/06	81.0	90.0	57.4	62.2	84.0	20.0	14.1	40.0	—	—	28.4
2006/07	85.4	90.0	59.0	66.6	91.0	25.0	41.5	44.0	0.5	—	36.5
2007/08	90.2	95.0	60.0	61.0	95.0	25.0	66.3	57.0	13.0	—	43.5
2008/09	92.6	95.0	65.0	65.7	95.0	25.0	74.0	71.0	20.0	1.6	47.1
2009/10	95.0	95.0	62.0	68.0	95.0	85.0	79.3	61.0	20.0	30.5	52.0

Source: International Cotton Advisory Committee

Notes: '—' indicates that no biotech cotton was used.